



The Regional Biomass Energy Program (RBEP) promotes increased production and use of bioenergy resources, and helps advance the use of renewable biomass feedstocks and technologies. Historically, the RBEP leverages two nonfederal dollars for every federal dollar it administers.

Benefits of Agro-Plastics

- Reduces use of petroleum-based polymers
- Reduces processing temperatures for lower energy use
- Increases strength in plastics
- Products weigh less and require less energy for shipping
- Reduces cycle times (up to 25% faster production)
- Cost competitive with conventional fillers

“Agro-Plastic should be ideal for making high-volume, low-cost products, such as interior automotive panels, garbage pails, tool handles, and flower pots. The new material is less expensive than other types of filled plastic.”

Donna Johnson, President
Pinnacle Technology, Inc.



U.S. Department of Energy
Regional Biomass Energy Program

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ANOTHER RBEP SUCCESS: Agricultural wastes make “agro-plastics” lighter and stronger

CHALLENGE

Because polymers, the basic ingredient in plastics, are relatively expensive, manufacturers commonly add less expensive “fillers” that help extend the polymers. However, technical reasons limit using existing fillers up to about 20% of the mix.

Plastic manufacturers would like to find an inexpensive filler they can use as a main ingredient to reduce polymer use and enhance the performance of their plastics.

RBEP SOLUTION

The U.S. Department of Energy’s Regional Biomass Energy Program helped fund research into technology that converts wheat straw – the crop waste left after harvesting wheat – into a filler for plastics. Plant residues are inherently light and strong, and initial laboratory research indicated these residues could be used as filler for as much as 30-80% of the plastic mix.

Pinnacle Technology licensed the technology and began working to commercialize a process that converts wheat straw and polypropylene into an “agro-plastic” suitable for injection molding or extrusion.

A market study was conducted to assess plastic manufacturers’ interest in agro-plastic, which also identified those companies interested in making trial manufacturing runs using agro-plastic.



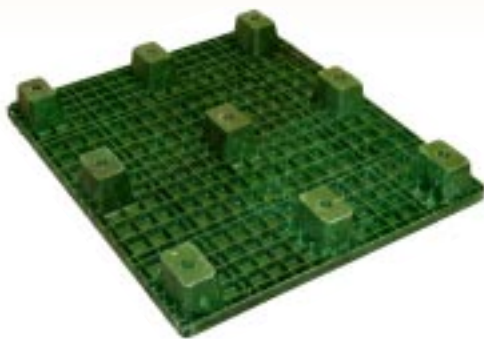
Award

For its work on agro-plastic, Pinnacle received a 1998 Tibbetts Award, which recognizes the technological innovation, economic impact and business achievements of the nation's leading participants in the Small Business Innovation Research program.

Partners

U.S. Department of Energy
Regional Biomass Energy Program

Agro-Plastics, Inc., a division of
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Pallet made from agro-plastic

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RESULTS

Four separate production runs were made for four different injection-molded agro-plastic parts: an artificial Christmas tree, a rain downspout splashguard, a boat seat, and a business card holder. Many of the parts were manufactured between 10-20% faster than with conventional fillers. One manufacturer participating in the test actually doubled throughput with the agro-plastic parts.

The manufactured parts exhibited increased tensile and flexural strength, compared with unfilled polypropylene. Another benefit was that the large particles of the wheat straw filler were visible within the plastic, giving the products the natural-looking, matte finish appearance of wood.

BENEFITS

An agro-plastic production facility would be ideal for a rural agricultural community where there is a need for jobs and an adequate supply of wheat straw.



Agro-plastic production plants could also create an additional \$1.2- \$1.8 billion dollar market nationwide for farmers who could sell the wheat straw that was previously considered an agricultural waste and left on fields after harvest.

Since agro-plastic can be manufactured in unlimited lengths, its use as interior trim wood that doesn't have knots or splices makes it an ideal substitute for real wood, which in longer lengths is increasingly in short supply for trim use. Using agro-plastic would reduce wood consumption, making the construction industry potentially the largest market for agro-plastic.

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